Competitive effect of *Lolium rigidum* Gaud. on the yield and biomass of barley

Jordi Izquierdo*, Jordi Recasens* and César Fernández-Quintanilla**
* Dept. de Hortofructicultura, Botànica i Jardineria. ETSEA. Universitat de Lleida
Av. Rovira Roure, 177, E-25198 Lleida, Spain
** Ciencias Medioambientales. CSIC. C/ Serrano, 115, E- 28006 Madrid, Spain

Lolium rigidum is one of the most common weeds of the cereal fields in Mediterranean areas (Jauzein & Montegut, 1983). Some studies have been carried out analysing the competitive effect of this weed on wheat and triticale (Reeves, 1976; Lemerle *et al.*, 1979; Rerkasem *et al.*, 1980; Medd *et al.*, 1985) but very few information is available about the competition effect on winter barley (Cousens, 1996). In the present work, the effects of ryegrass on barley biomass, yield loss and yield components were studied when the crop was grown at different densities.

The experiment was conducted in 1994/95 at Alguaire, in the North East of Spain, on a loamy soil. Sowing density of barley was 75 and 150 kg ha^{-1} and a range of ryegrass seeds was sown to give the seedling densities of 0, 25, 50, 500 and 1000 plants m^{-2}. Each treatment was repeated four times, giving a total of 40 plots of 1.5x8.5 m^2, in a split-plot design. At final harvest, crop yield and yield components were determined from two 50x50 cm^2 squares thrown at random in each plot.

Yield loss was larger in the plots with 75 kg ha^{-1} of barley (maximum loss of 50 %) than in plots with 150 kg/ha (maximum loss of 37 %) (Fig. 1a). Crop biomass decreased as a result of weed competition following a similar trend in the two crop densities: 1000 ryegrass plants m^{-2} decreased crop biomass by 36 % (Fig. 1b). Among the yield components, only the number of ears m^{-2} in both crop sowing densities was affected by ryegrass competition (not shown).

Competition took place only in the early stages of development. Drought suffered during the rest of the growing season affected ryegrass development and as a consequence, plants became less competitive than usual and interference between barley and the weed could not be detected. Barley growing at high densities had a great competitiveness and was able to reduce the competition due to ryegrass.

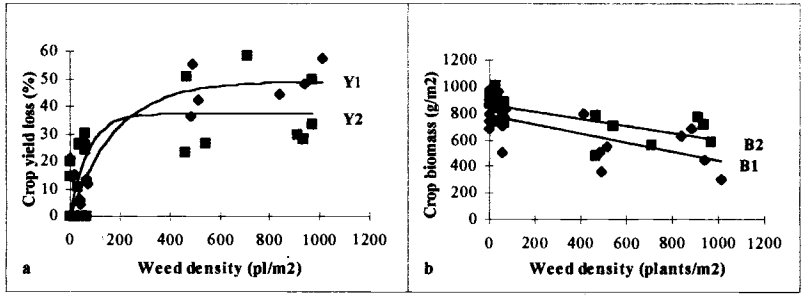

Figure 1. Relationships between ryegrass density (*D*) and barley yield loss (a) and barley biomass (b) for the barley densities of 75 (*Y1, B1*) and 150 kg ha^{-1} (*Y2, B2*) in the 40 plots at Alguaire (Spain). Regression models are: $Y1=49.05-49.05*0.995^{D}$; $Y2=37.30-37.30*0.986^{D}$; $B1=780.08-0.34*D$; $B2=862.03-0.265*D$.